



299-E28-59 (A6810)

Log Data Report

Borehole Information:

Borehole: 299-E28-59 (A6810)		Site: 216-B-9 Crib			
Coordinates (WA State Plane)		GWL (ft)¹: Not Reached		GWL Date: N/A ²	
North	East	Drill Date	TOC³ Elevation	Total Depth (ft)	Type
136,877.8 m	573,839.6 m	July 1948	208.0 m	150	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel Welded	2.1	8.625	8.0	0.3125	0	144.5

Borehole Notes:

The logging engineer measured the stickup using a steel tape. A reference point survey "X" is located on top of casing stickup. Calipers were used to measure the casing wall thickness and the outside diameter; the inside diameter is calculated. Zero reference is the top of casing stickup, which is cut squarely. HWIS⁴ is the source of the TOC elevation and coordinates. Total depth (ground level reference) and casing bottom (TOC reference) are reported from information provided in Chamness and Merz (1993). The borehole was swabbed on 03/12/02, and no contamination was detected.

Logging Equipment Information:

Logging System:	Gamma 2A	Type:	SGLS (35%)
Calibration Date:	11/01/01	Calibration Reference:	GJO-2002-286-TAR
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	Repeat	
Date	04/08/02	04/09/02	04/10/02	04/10/02	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	2.5	144.5	45.0	17.5	
Finish Depth (ft)	19.0	44.0	18.0	2.5	
Count Time (sec)	100	100	100	100	
Live/Real	R	R	R	R	
Shield (Y/N)	N/A	N/A	N/A	N/A	
MSA Interval (ft)	0.5	0.5	0.5	0.5	
ft/min	N/A	N/A	N/A	N/A	
Pre-Verification	BA123CAB	BA125CAB	BA126CAB	BA126CAB	
Start File	BA124000	BA125000	BA126000	BA126055	
Finish File	BA124033	BA125201	BA126054	BA126085	
Post-Verification	BA124CAA	BA125CAA	BA128CAA	BA128CAA	
Depth Return	0	0	N/A	0	

Log Run	1	2	3	Repeat	
Error (ft)					
Comments	No fine-gain adjustment.	No fine-gain adjustment.	No fine-gain adjustment.	Repeat section. No fine-gain adjustment.	

Logging Operation Notes:

Zero reference is the top of casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT verifier with SN 082.

During SGLS logging, fine-gain adjustments were not necessary to maintain the 1460-keV (⁴⁰K) photopeak at a pre-described channel.

Analysis Notes:

Analyst:	Sobczyk	Date:	05/06/02	Reference:	MAC-HGLP 1.6.3, Rev. 0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. The verification spectra were all within the control limits. The recorded peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were within 3.5 percent of one another at each spectrum's energy line. The post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC Supervisor.

Spectra for the SGLS were processed in batch mode using APTEC Supervisor to identify individual energy peaks and determine count rates. Concentrations were calculated in EXCEL (source file: G2ANov1.xls), using parameters determined from analysis of recent calibration data. Zero reference is the top of the casing. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 0.322 in. to a log depth of 144.5 ft. A casing thickness of 0.322 in. is the published value for ASTM schedule-40 steel pipe (a commonly used casing material at Hanford). This casing thickness is within the range of measurement error associated with the logging engineer's measurements. A water correction was not needed or applied to the SGLS data. Dead time corrections were not needed because dead time did not exceed 10.5 percent.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (⁴⁰K, ²³⁸U, and ²³²Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation.

Results and Interpretations:

¹³⁷Cs and ²³⁵U were the man-made radionuclides detected in this borehole. ¹³⁷Cs was detected near the ground surface (4.0- and 4.5-ft log depth) at activities ranging from 0.3 to 0.6 pCi/g. ¹³⁷Cs was also detected at 104.5 ft with an activity of about 0.2 pCi/g near its MDL of about 0.2 pCi/g. At 9.5 ft, ²³⁵U was detected on the repeat log run with an activity of about 1 pCi/g near its MDL of about 0.9 pCi/g.

Recognizable changes in the KUT logs occurred in this borehole. A change of about 5 pCi/g in apparent ^{40}K activities occurs at about 23 ft. This increase in ^{40}K activities probably represents the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate good repeatability of the SGLS data for the naturally occurring radionuclides. The plots of the repeat logs demonstrate good repeatability of the SGLS data for ^{137}Cs at 4.0 and 4.5 ft. ^{235}U was detected on the repeat log run near its MDL and not on the original log run.

Gross gamma profiles from Additon et al. (1978) (attached) indicate that the sediments surrounding this borehole may have contained minor amounts of gamma-emitting contamination. The profile from 5/24/63 may have detected gamma activity above background in the interval from 62 to 72 ft (19 to 22 m). Elevated gamma activity is not detected on the 5/4/76 profile. The SGLS did not detect man-made radionuclides in this interval.

References:

Additon, M.K., K.R. Fecht, T.L. Jones and G.V. Last, 1978. *Scintillation Probe Profiles From 200 East Area Crib Monitoring Wells*, RHO-LD-28, Rockwell Hanford Operations, Richland, Washington.

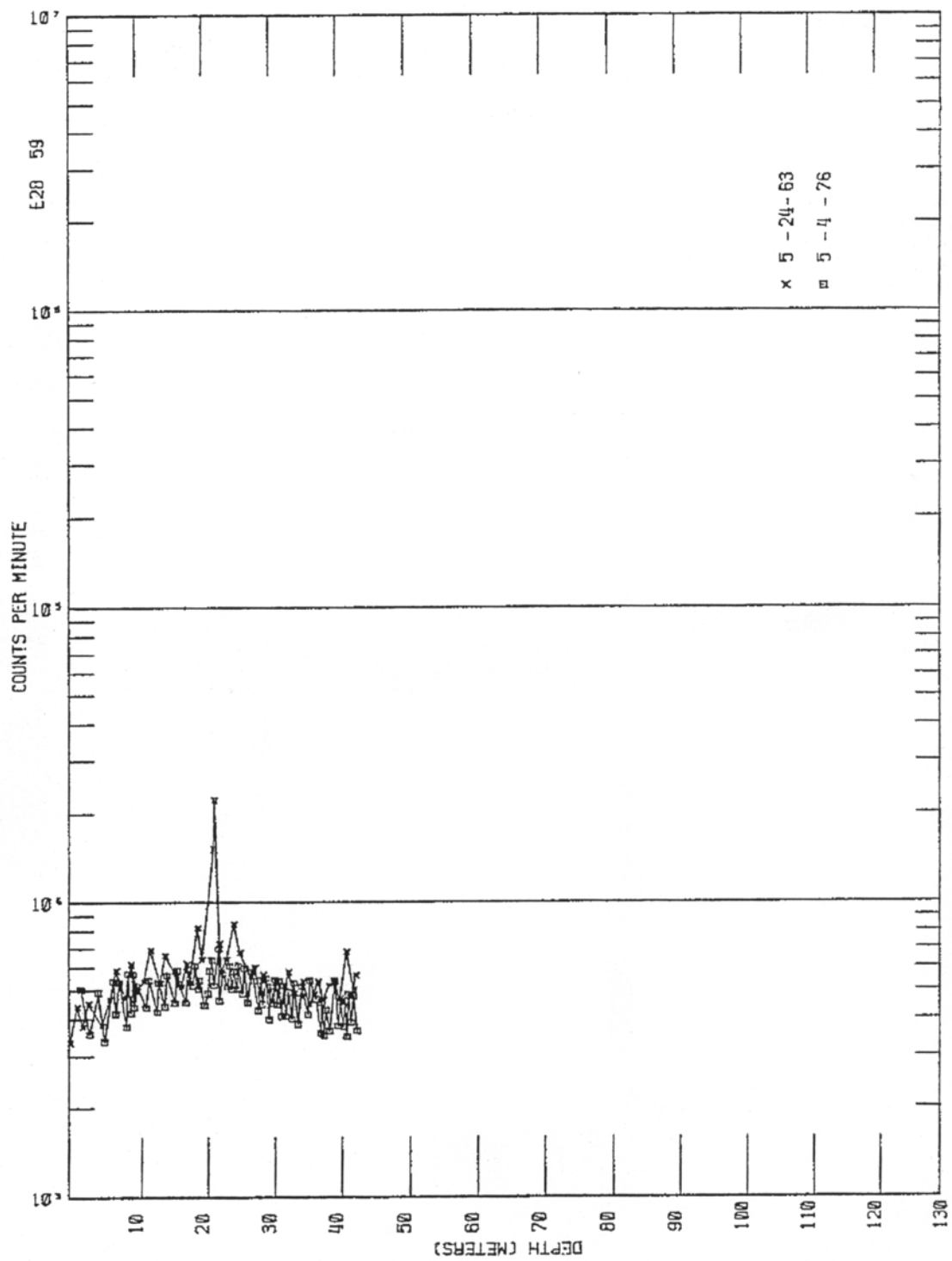
Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNNL-8800, UC-903, Pacific Northwest Laboratory, Richland, Washington.

¹ GWL – groundwater level

² N/A – not applicable

³ TOC – top of casing

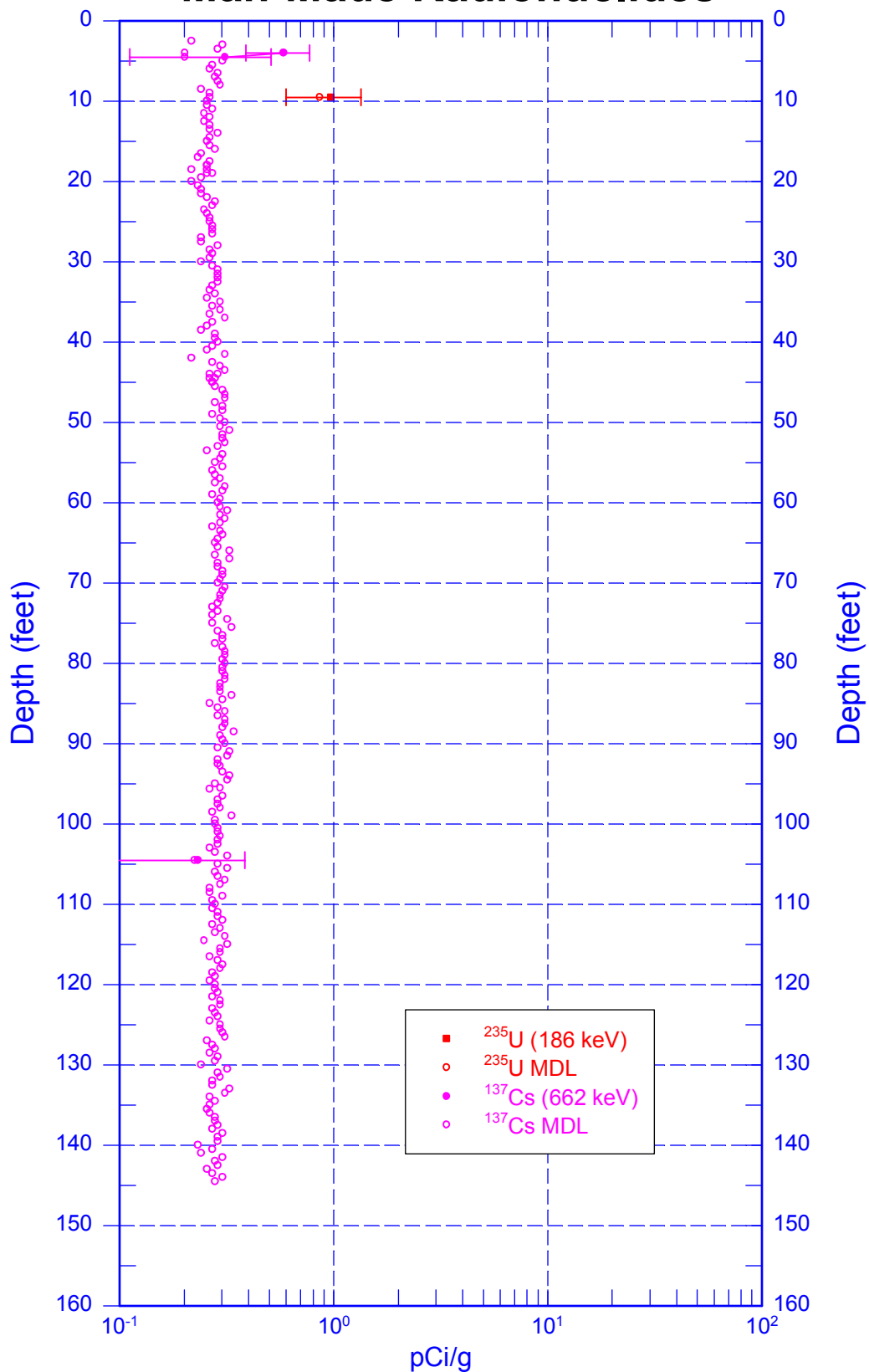
⁴ HWIS – Hanford Well Information System



from Additon et al. (1978)

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Man-Made Radionuclides

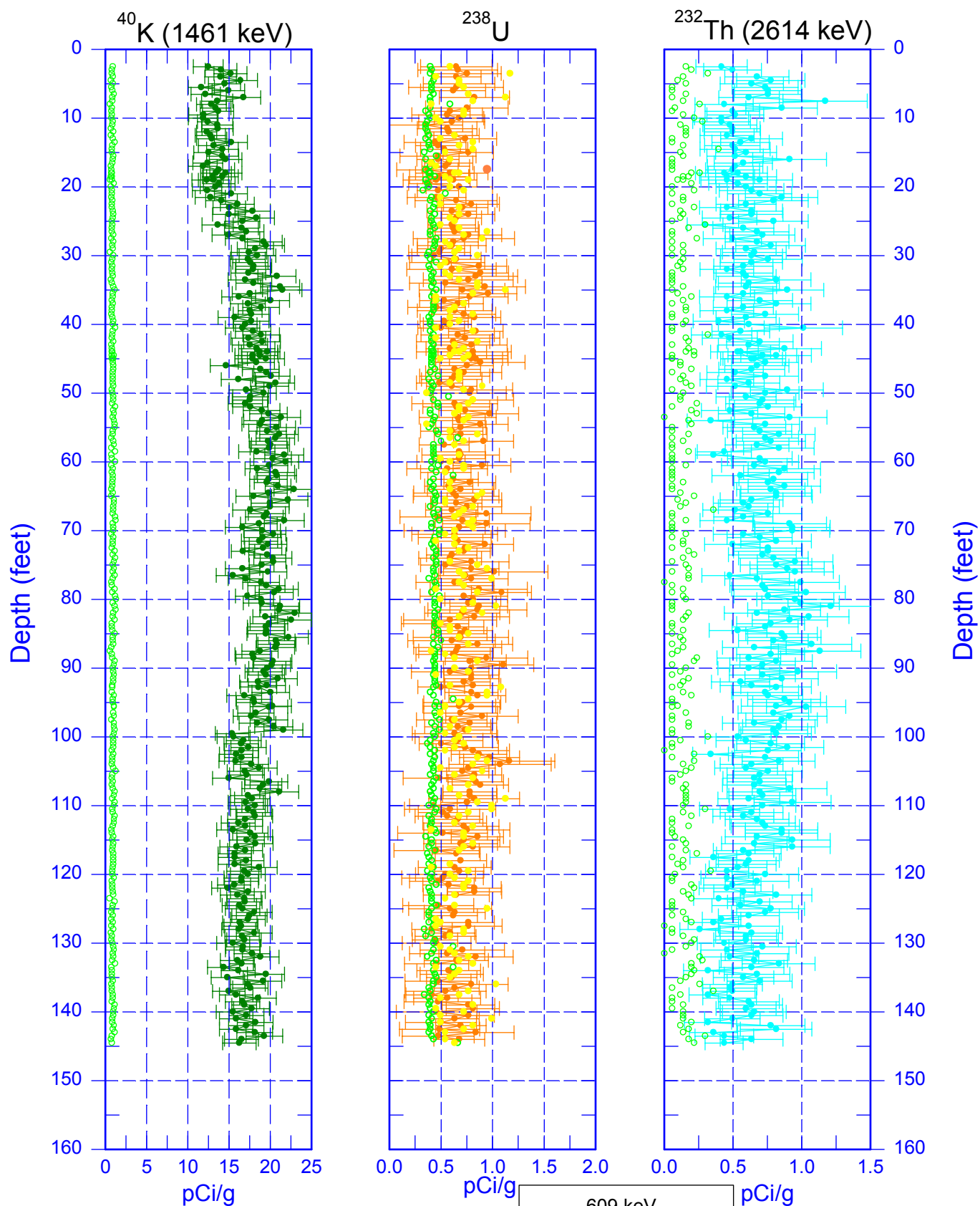


Zero Reference = Top of Casing

Date of Last Logging Run
04/10/2002

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Natural Gamma Logs

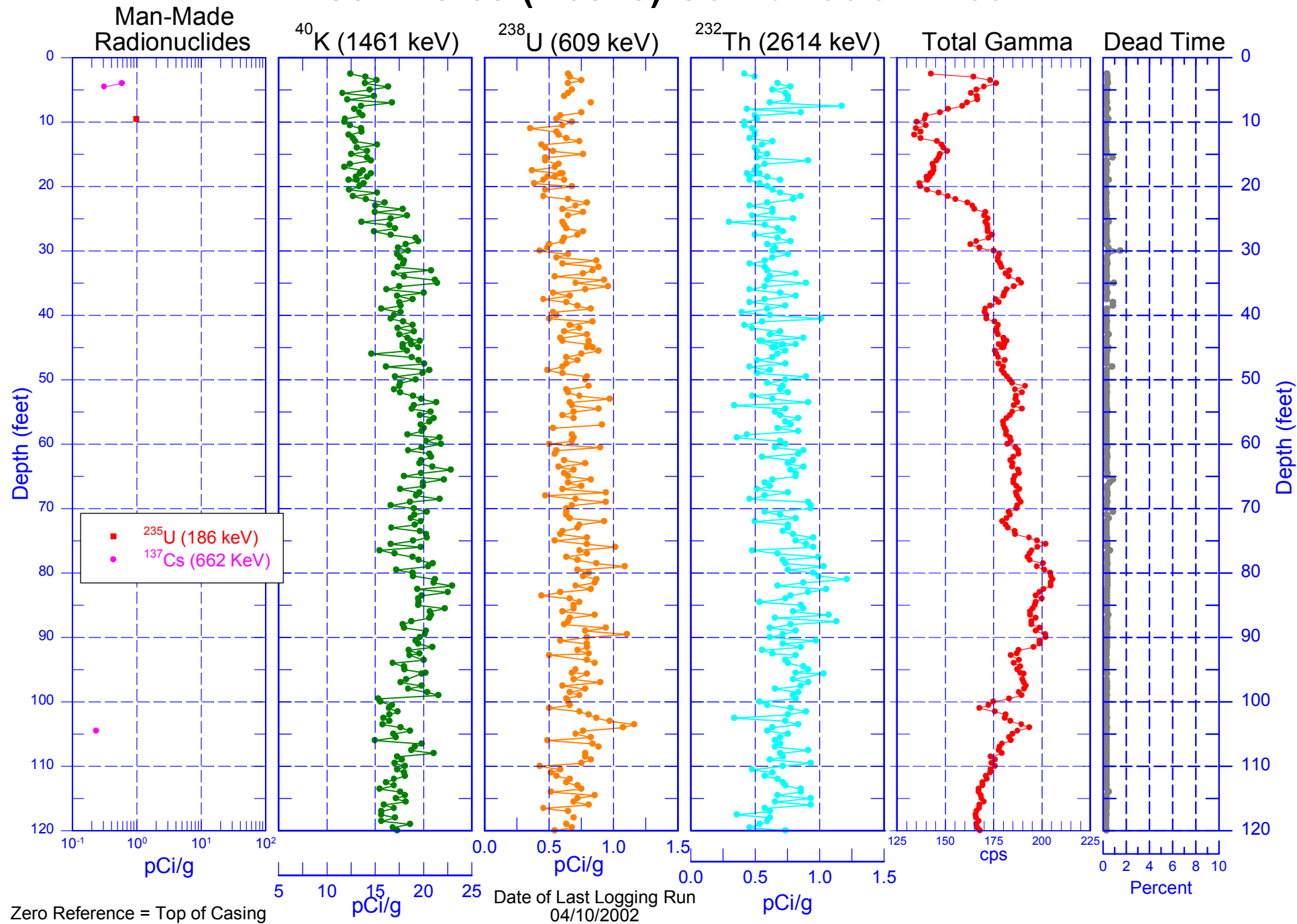


○ MDL

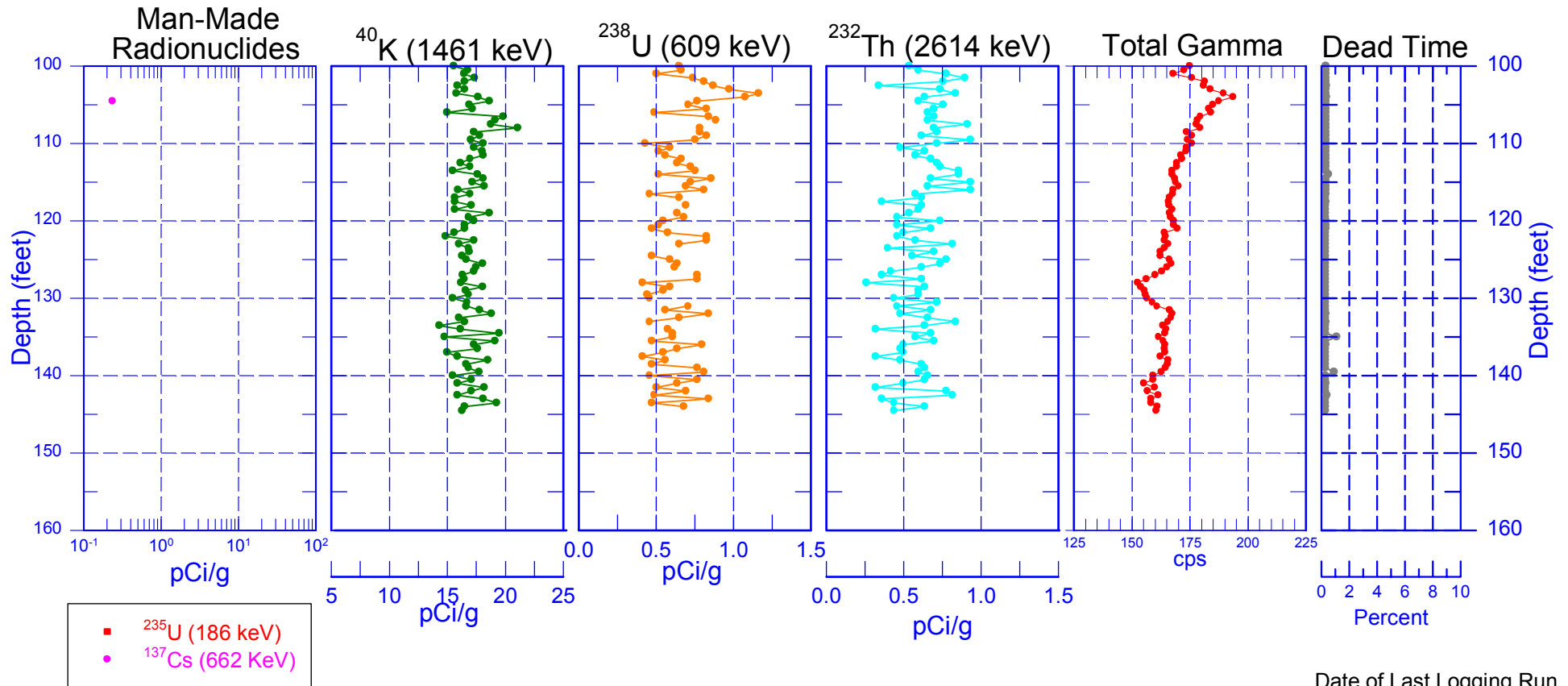
Zero Reference = Top of Casing

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299-E28-59 (A6810) Combination Plot



299-E28-59 (A6810) Combination Plot

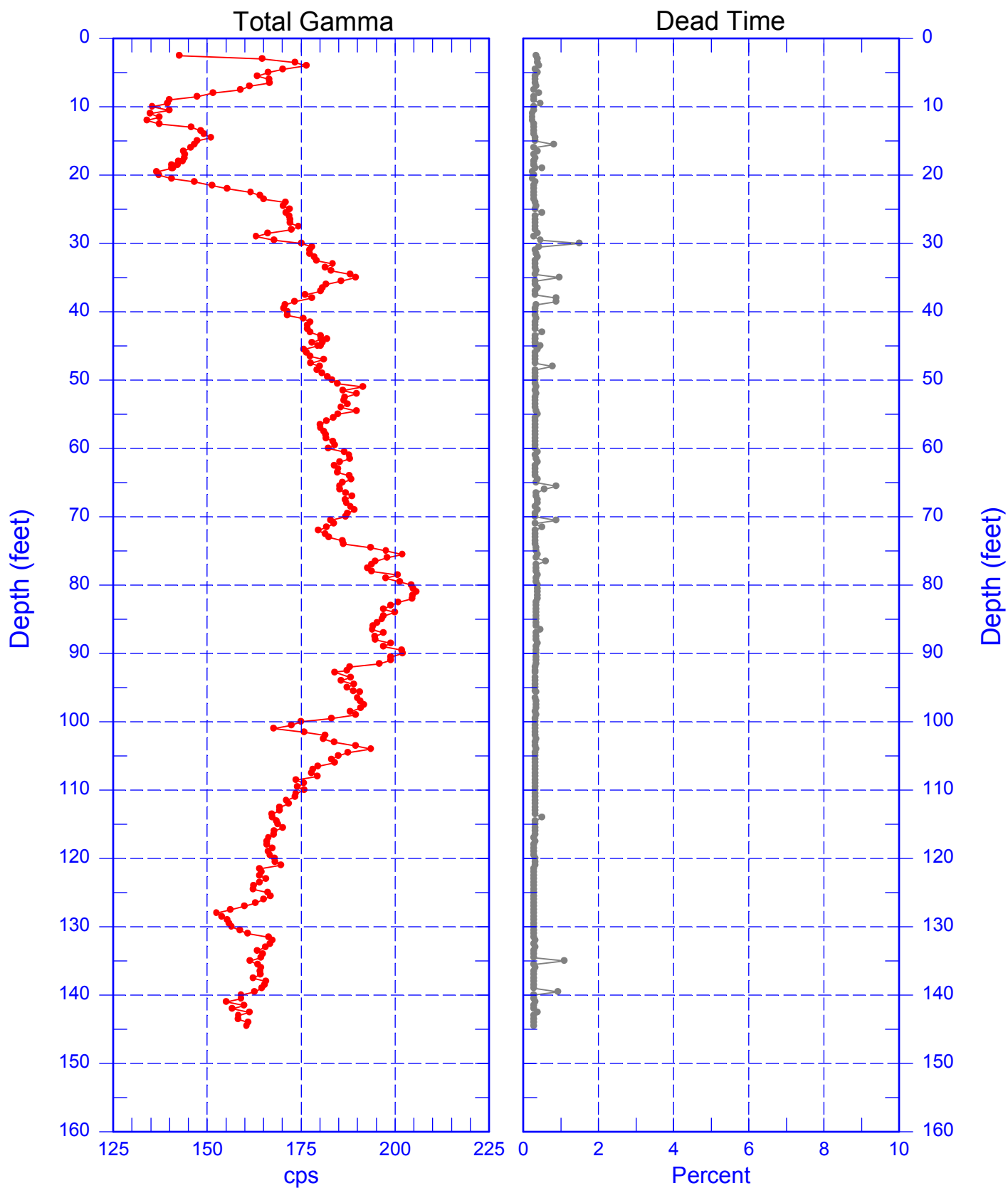


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Total Gamma & Dead Time

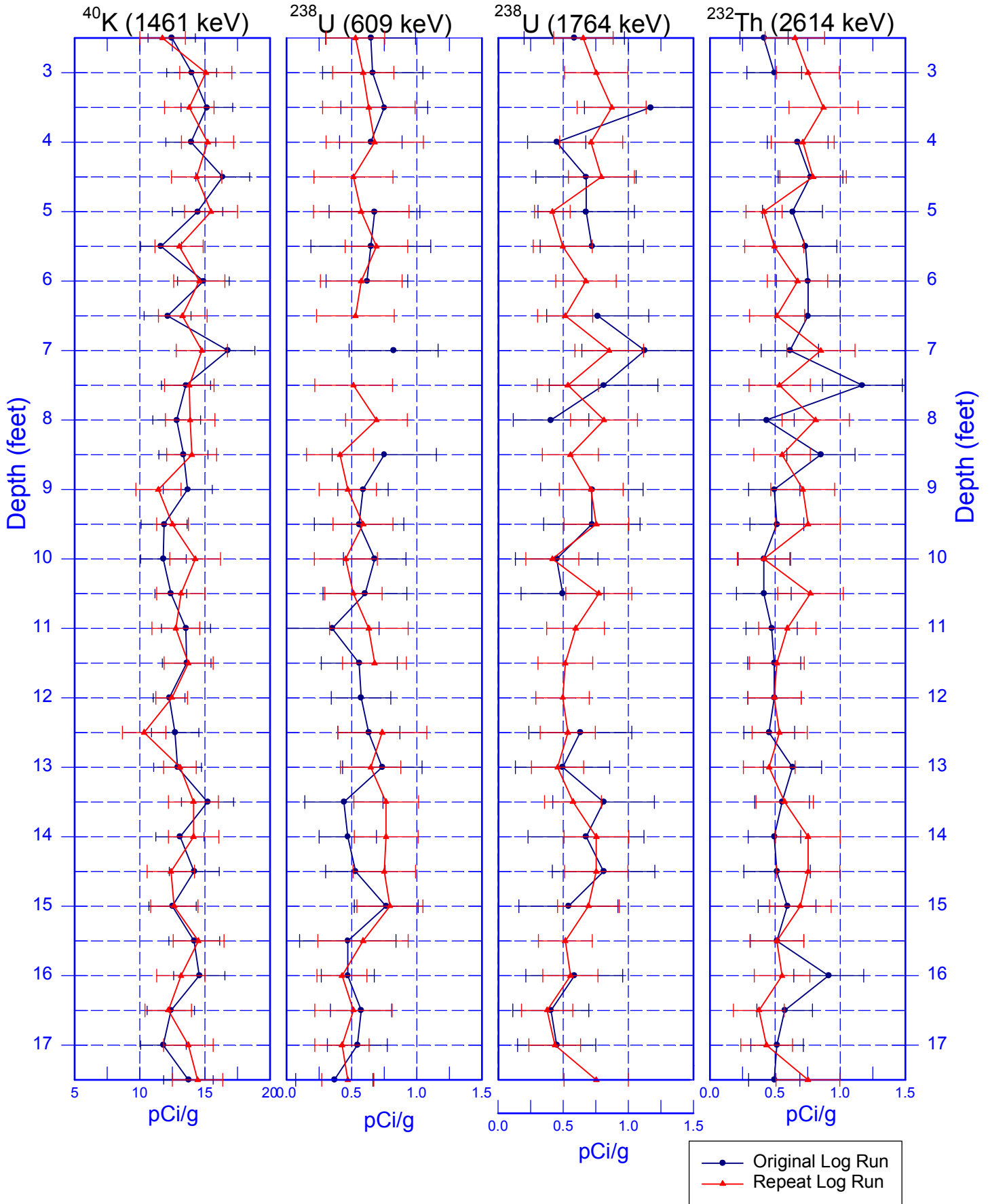


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Rerun of Natural Gamma Logs (2.5 to 17.5 ft)



299-E28-59 (A6810)

Rerun of Man-Made Radionuclides (2.5 to 17.5 ft)

